Massoth®

DiMAX® 530S
Motor/Switch Decoder 8156001
Version 1.0 – 11/07

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1 Brief Discription

The DiMAX® Motor/Switch Decoder is an all-purpose decoder with 8 switch outputs. These outputs may be controlled digitally or by reed reais or other switches.

The DiMAX® Motor/Switch Decoder may be e.g. utilized to control the boom of a crane horizontally and vertically as well as the bucket or the winch.

Programming is achieved with CV settings which can be programmed by every digital system. Additionally the DiMAX® Motor/Switch Decoder supports PoM (Programming on the main track). The DiMAX® Motor/Switch Decoder is able to control all switch drives available on the market: coil-operated (2-lead and 3-lead) as well as motor driven.

A special feature is the capability to operate 6 programmable inputs by contact triggering. This facilitates the direct operation of a switch by a push-button on a control board or by a triggered track contact.

1.1 Features of the DiMAX® Motor/Switch Decoder

- Digital Motor/Switch Decoder for NMRA-DCC compatible operation
- Up to 8 function outputs (incl. 3X2 for motor or EPL drive)
- Up to 6 inputs for manual control
- Overload protection for all functions
- Hook up via a 17 pole C-clamp
- Controllable by either loco addresses (1..10239) or switch addresses (1..2048)
- Convenient function mapping when using loco addresses including direction assignment.
- Programmable flashing light function and short term function
- Multiple programming options (Register, CV, PoM)
- Reset function for all CV values

1.2 Scope of Supply

- **- DiMAX® 530S Motor/Switch Decoder**
- **- Manual**

Please contact Massoth Electronics USA if any of the above components are damaged or missing.

2 Hook-Up and Operation

- Check the applicable wiring diagram for the hook-up method. Basically the decoder is protected against short-circuit and overload. However in case of a connection error (e.g. function and track power) this safety feature cannot work and the decoder will be destroyed subsequently.
- The factory setting of the DiMAX® Motor/Switch Decoder is address 1..3. In case a loco address is to be used, CV 29 must be altered accordingly.
- Place the DiMAX® Motor/Switch Decoder in a protected location. The unit must not be exposed to moisture and high temperature changes.
- The DiMAX® Motor/Switch Decoder must only be connected to digital central stations for model railroads according to the NMRS standards. Connecting the module to other appliances may lead to the destruction of the unit.
- This unit is not a toy!

2.1 Contact Assignment

2.1.1 Function Outputs
• The function outputs 1+2 (SW1) , 3+4 (SW2) and 5+6 (SW3) are coupled. These outputs feature a dual power amplifier to facilitate the operation of switch drives in two directions. Therefore these coupled outputs must never be operated at the same time. An intelligent protection software inhibits the operation in one direction in case the reverse direction output is switched on at the same time. The outputs 7+8 are regular outputs, they are not coupled.
• The terminals of F7+F8 (K5+K6) have a dual function. In the switch mode (CV29-Bit7 = 1) the functions F7 + F8 are not available. In the loco mode the functions F7 + F8 are only usable if the contact inputs K5 and K6 are deactivated.
• The function outputs are freely programmable in the loco mode. (F-key assignment and direction dependent control).
• **Note:** Make sure the speed step setting of the DiMAX® Motor/Switch Decoder is the same as the setting of the digital system used. Otherwise the light functions will not work properly. The light might blink or might not work at all.

Illustration 1: Switch Hook up
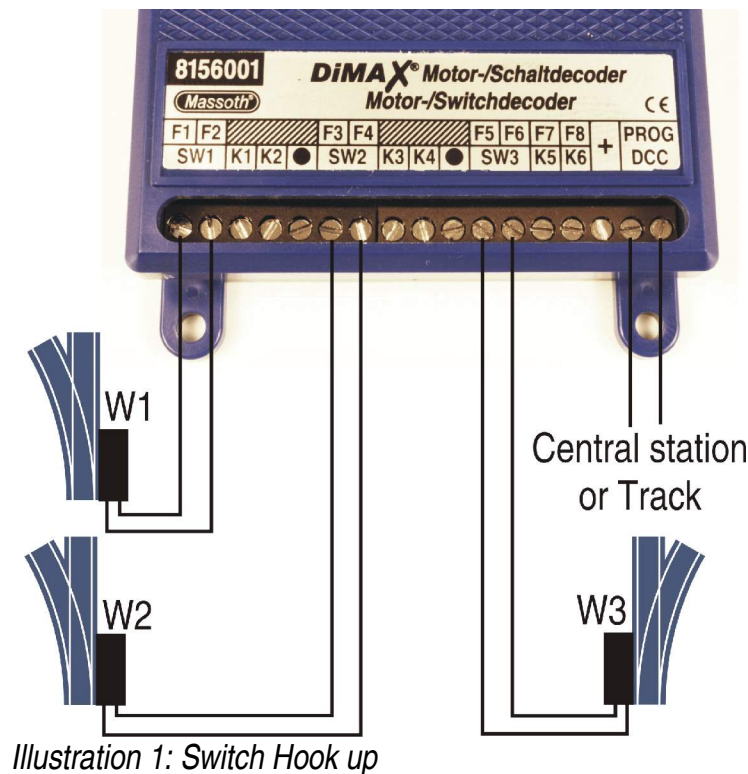
2.1.2 Contact Inputs
• The contact inputs may be used for the manual operation of switches (e.g. operate a switch by triggering a track contact). Alternatively they may be used as inputs for limit or position switches for a function.
• The contacts are firmly linked to the respective function outputs. K1+K2 control F1+F2 (SW1) , K3+K4 control F3+F4 (SW2) , K5+K6 control F5+F6 (SW3).
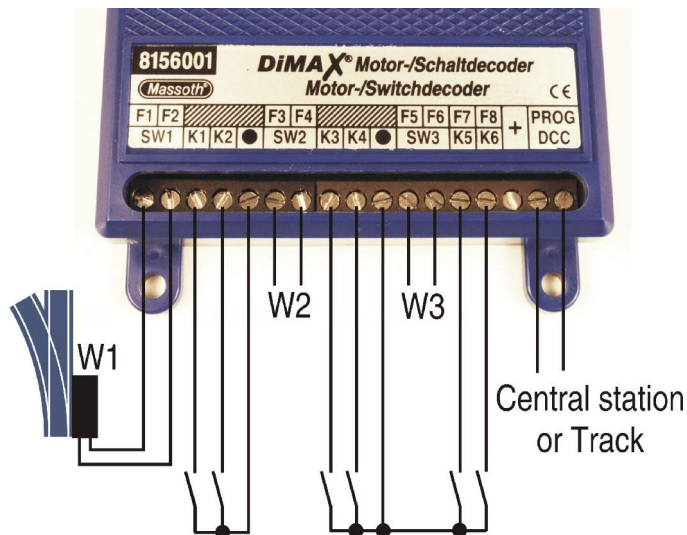
Illustration 2: Contact controlled switches

2.1.3 Additional Applications
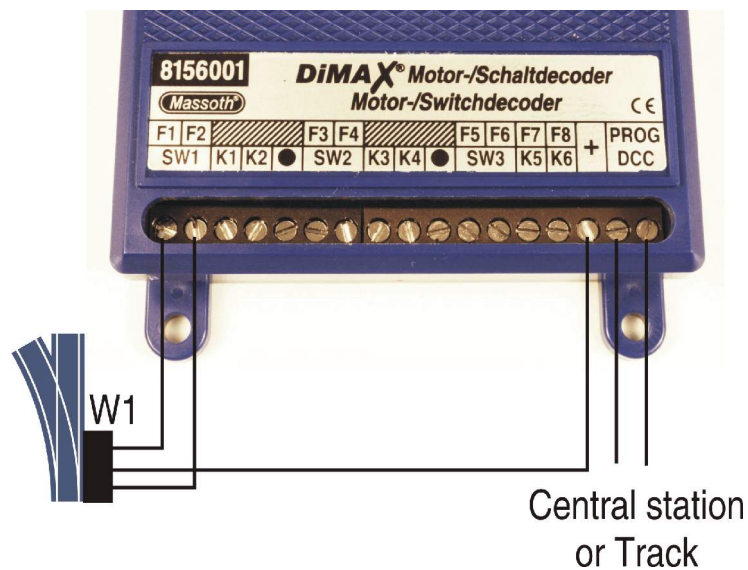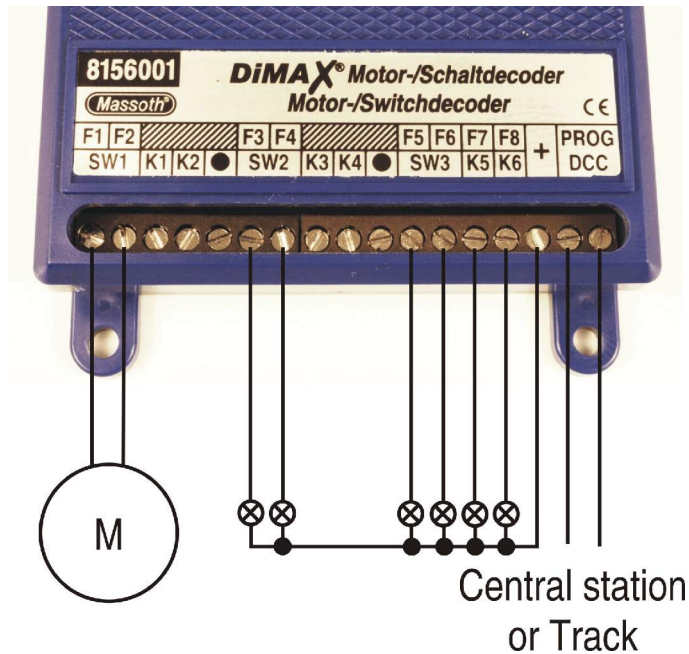e.g. dual coil drive, electrical motors, light bulbs

Illustration 3: Switch with dual coil drive

Illustration 4: Motor- / Light Bulb hookup

3 Settings and Programming

All described programming methods (except PoM) are to be executed on a programming track. Check the manual of your central station or programming module for the correct procedure. In CV2 a programming lock may be set to avoid accidental programming of the module.
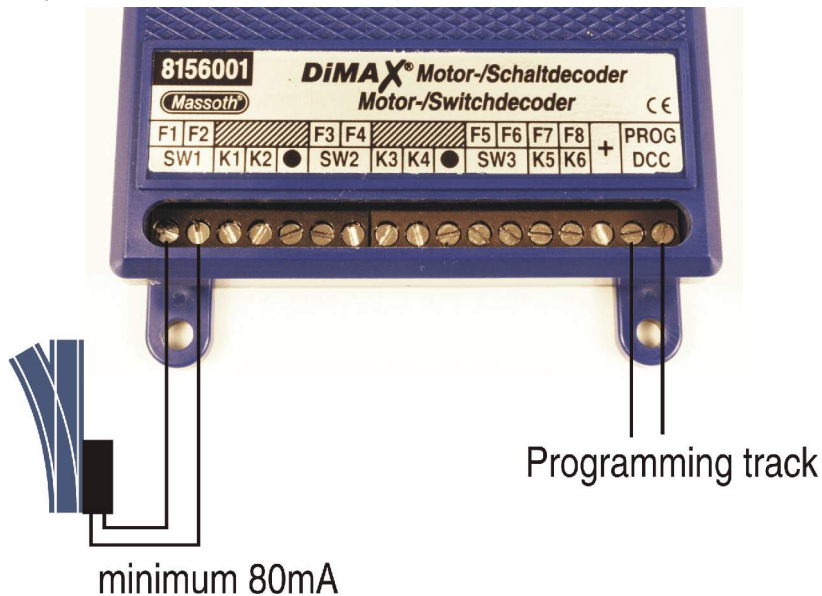
Illustration 5: Programming

CV2=77: Programming lock deactivated (default)

CV2=0: Programming inhibited (except CV2).

In order to receive a programming confirmation, a load of at least 80mA must be connected to F1, e.g. a switch motor. This enables the module to send back a confirmation signal to the central station. Programming will be achieved at all times even if there is no confirmation signal possible.

Note: The programming methods shown below are not supported by all digital systems.

Register direct	CVs 1..4 are directly programmable
CV indirect	All changeable CVs may be programmed by „Register direct". Enter CV-Number in Reg. 6 , thereafter write CV-value in Register 5.
Write CVs	All changeable CVs may be programmed.
Write CVs Bit by Bit	All changeable CVs may be programmed.
Read CVs	Read all CVs.
Program on Main (PoM)	All changeable CVs are programmable except CV1. After programming the decoder will perform a reset in order to activate the new settings. PoM is only usable in the loco mode.

3.1 Programming binary values

Certain CVs consist of 'binary' values (e.g. CV29). This means that several settings are combined in one single value. Each function has a digit and a value. Programming a CV of this kind requires all values to be summed up. A deactivated function allways has the value '0', an activated function the value given in the CV-table. Add up all values of the activated functions and write the sum in the CV.

> Let's take the NMRA Configuration Register (CV29) as an example:
> You intend to program normal driving direction, 28 speed steps, and high loco address. According to the CV-table Attachment1 this comes up to: 2+32=34. This means you have to program '34' in CV 29.

3.2 Switch-or Loco Address

- Each component connected to a digital control system requires an address. In the NMRA-DCC System there are three kinds of addresses: switch addresses (1..1024), low loco addresses (1..127) and high loco addresses (128..10239). A decoder must be programmed with an address.
- The switch addresses are in CV 31 - 36. To enable the use of the switch addresses CV29-Bit 7 must be 'ON'.
  CV31 = address / 256 (Only the integral value is to be programmed)
  CV32 = address – (CV31 x 256)
- The short loco address is located in CV1. This position allows values up to 127. Additionally CV29-Bit 5 and Bit 7 must be 'OFF'.
- The long loco address is programmed in CV17 + CV18.
  In addition CV29-Bit5 must be 'ON' and CV29-Bit7 must be 'OFF'.
  The long address is calculated like the switch address:
  For technical reasons '192' must be added to CV 17.

> Let's calculate the address 3000 as an example.
> 3000 / 256 = 11,72 this results in = 11+192 = CV17=203
> **Please note that 192 must only be added to the final result! For the calculation of CV18 the value is used without adding '192' (In this case 11)**
> The next step: 3000-(11x256) = 3000-2816 = CV18=189
> Consequently CV 17 must be programmed with 203 and CV 18 with 189.

- All digital systems (e.g. the DiMAX System) feature comfortable address programming: all CVs including CV29 are automatically calculated and programmed.

3.3 Resetting to Factory Setting

Writing 55 in CV7 resets all basic settings, writing 77 in CV7 resets all functions to factory settings. This can only be adchieved with the 'Writing CVs' procedure.
See 'Attachment 3' for the values of the factory setting

3.4 CV-Values

CVs are usable with loco addresses (L), switch addresses(S) or with both (LS).

CV	Description	Default	L/S	Range	Note
1	Loco address (Standard short)	3	L	1-127	If CV29, Bit5 = 0
2	Programming Lock	77	LS	0 + 77	0 = locked 77 = unlocked
5+6	Register mode: Reg6 = CV-addr. , Reg5 = Value	---	---	---	
7	Software Version	(10)	---	---	Read only
7	Decoder-Reset function (2 ranges available)	---	---	55 / 77	(See attachment 3)
8	Manufacturer ID	123	---	---	Read only
17	Long loco address (high byte)	128	L	128 .. 10239	If CV29, Bit5 = 1
18	Long loco address (low byte)				
29	Configurations Register NMRA	128	LS	See Attachment 1	
31	Switch address SW1 high	0	S	1..2048	
32	Switch address SW1 low	1	S		
33	Switch address SW2 high	0	S	1..2048	
34	Switch address SW2 low	2	S		
35	Switch address SW3 high	0	S	1..2048	
36	Switch address SW3 low	3	S		
41	F1 Command Allocation	1	L	0..16	0= Light 1..16=Function
42	F2 Command Allocation	2	L	0..16	0= Light 1..16=Function
43	F3 Command Allocation	3	L	0..16	0= Light 1..16=Function
44	F4 Command Allocation	4	L	0..16	0= Light 1..16=Function
45	F5 Command Allocation	5	L	0..16	0= Light 1..16=Function
46	F6 Command Allocation	6	L	0..16	0= Light 1..16=Function
47	F7 Command Allocation	7	L	0..16	0= Light 1..16=Function
48	F8 Command Allocation	8	L	0..16	0= Light 1..16=Function

CV	Description	Default	L/S	Range	Note
51	F1 Special Function	67	LS		See Attachment 2
52	F2 Special Function	67	LS		See Attachment 2
53	F3 Special Function	67	LS		See Attachment 2
54	F4 Special Function	67	LS		See Attachment 2
55	F5 Special Function	67	LS		See Attachment 2
56	F6 Special Function	67	LS		See Attachment 2
57	F7 Special Function	0	LS		See Attachment 2
58	F8 Special Function	0	LS		See Attachment 2
61	K1 Command	1	S	0=deactivated , 1= switch on , 2=switch off	
62	K2 Command	1	S	0=deactivated , 1= switch on , 2=switch off	
63	K3 Command	1	S	0=deactivated , 1= switch on , 2=switch off	
64	K4 Command	1	S	0=deactivated , 1= switch on , 2=switch off	
65	K5 Command	1	S	0=deactivated , 1= switch on , 2=switch off	
66	K6 Command	1	S	0=deactivated , 1= switch on , 2=switch off	

Attachment 1. (CV29) – NMRA-Configuration

Bit	OFF (Value=0) Application	ON	Value	Note
0	Normal Driving Direction	Reverse Driv.Direction	1	
1	14 Speed Steps	28 Speed Steps	2	Setting important for lights
5	Short Address (CV1)	Long Address (CV17+18)	32	
7	Loco Address	Switch Address	128	

Attachment 2. (CV51 .. 58) – Special Functions F1 + F2 + F3 + F4 + F5 + F6 +F7 + F8

Value	Application	Note
0	0 = Continuous Operation (Standard Function)	
1..15	Continuous Symmetric Flashing (Time Base 0,25 sec per unit)	Output flashes symmetrically
(1..15) +64	Short Term Function, Monoflop (Time Base 0,25 sec per unit) Switch Function!	Output switches off automatically after reaching the time limit. The additional value must be added.
(1..15) + 128 / +192	Asymmetrical Flashing (Short) / Asymmetrical Flashing (Long) 1/3 ON – 2/3 OFF	Short ON/Long OFF The additional value must be added.
16	Inverse Coupling with output F1 resp. F3 (Alternating flashing)	CV52: (F2 an F1) + CV54: (F4 an F3) + CV56: (F6 an F5)

Attachment 3. (CV7) RESETTING

To reset the decoder to factory setting, insert the desired value into CV7.

RESET	CV-Values for Reset Programming
55	1=3, 17=128, 18=128, 29=128, 31=0, 32=1, 33=0, 34=2, 35=0, 36=3
77	41=1, 42=2, 43=3, 44=4, 45=5, 46=6, 47=7, 48=8, 51=67, 52=67, 53=67, 54=67, 55=67, 56=67, 57=0, 58=0, 61...66=1

4 TECHNICAL SPECIFICATIONS

Power Supply: 12 .. 24V DCC (In peaks max. 27V)

Maximum Allowable Load: Max. 2Amps

Function Outputs : Max. 1,5Amps per Output

Contact Inputs : connected towards GND

Current Draw : approx. 30mAmps

Operating Temperatur Range: 32° .. 125° F

• To prevent condensation make sure the module is at operating temperatur before starting operation.

Dimensions: 78 x 68 x 20 (L/W/H)mm

5 Important Notice

Never suspend the DiMAX Motor/Switch Decoder to shock or stress. Avoid short circuits of the connecting wires. Avoid bridging of neighbouring wires and do not crush the connecting wires.

5.1 Moisture

The housing of the DiMAX Motor/Switch Decoder is protected from splashed water. However it is not waterproof. This is the reason why this module must only be operated in a dry environment. Protect the module from moisture, humidity, and water. Moisture and humidity may limit the functionality significantly or may destroy the unit.

5.2 Warranty

Massoth Electronics USA warrants this product for 1 year from the date of purchase. This product is warranted against defects in materials and workmanship. Peripheral component damage is not covered by this warranty. Normal wear and tear, consumer modifications as well as improper use or installation are not covered. Errors and changes excepted.

5.3 Important Notes

This product is not a toy. This product may have sharp corners and edges and may be harmful if swallowed. Handling the item may cause restraint injuries. If not trained properly do not handle this product; have a professional install this item. Operate this product only with products posted in this manual. Electrical specifications and measurements are subject to change without prior notice.

5.4 Support

Please visit www.massoth.com. On our website the latest software and manuals are provided. For further support and detailed questions you may contact your dealer or the manufacturer at (email) sales@massoth.com.

Hotline hours USA: 09:00 a.m. To 4:00 p.m. EST Mo thru Fr

Phone: 770-886-6670
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5.   Manufacturer information

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